MASTERS OPEN DEFENSE EXAMINATION

BUILDING THE BASIS FOR DEVELOPMENT

Determinants of Economic Growth in Ethiopia

Msc Thesis Presentation

Kemal Saide

Major Advisor: Haile Girma (Ass.Prof.)
Co-Advisor: Dagim Alamire (Lecturer)

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Outlines of presentation

- ☒ Introduction
- ☒ Methods and Materials
- ☒ Result and Discussion
- ☒ Summary and Conclusion
- ☒ Recommendations

1. Introduction

- The debate on the key drivers of economic growth has been ongoing and it is still far from over (Nihat, et al., 2013; Mbulawa, 2015; Obrimah, 2015).
- However, the general agreement is that sources of growth are both internal and external to a country's economy.
- **Really, the role of** macroeconomic stability through; stable prices (low inflation),low levels of debt (whether foreign or domestic) and free market economy,low levels of unemployment, are **considered crucial in drive** sustainable economy (Mbulawa, 2015).
- **As witnessed by the recent experiences** some East Asian countries **have recorded amazing economic performances** while the Sub-Saharan Africa (SSA) countries have not been able to obtain the kind of sustained-growth **which commonly regarded as premise of development.**

1. Introduction----cont.

- Ethiopia belongs to SAA countries where poverty is widespread though the country has recently experienced attractive economic growth (Tadesse, 2011).
- Ethiopia has passed through different politically distinct regimes with different policy reforms and various changes in economic growth since 1930:
- The Derg Regime (1974-1991) .The general growth rate of GDP was 1.6%.However, during this regime, Ethiopia experienced a very high growth rate which is 7.9 % per annum. This achievement is because of the best rains season at the time (Alemayehu, 2001).

- Ethiopian People Revolutionary Democratic Front (1991-present Prosperity Party).
- 1992= Ethiopia began to see accelerated economic progress
- Real GDP growth averaged 11.2% per annum (NBE, 2013) and averaging 10.9% (WB, 2016) during 2003/04 -2008/09 and 2004-2014 periods respectively.
- However, According to (World Bank, 2021), even though Ethiopia's economy experienced strong, broad-based growth averaging 9.4% a year from 2010/11 to 2019/20, due to COVID-19 (coronavirus pandemic) Ethiopia's real gross domestic product (GDP) growth slowed down to 6.1% in

1. Introduction cont'd…

- Generally, Ethiopian economic history is characterized by ups and downs of economic performance owing to different regimes of ruling governments and their associated policies and objectives for what the government set policies.
- This can be the reason for the low level of living standards that the present Ethiopia is encountering.
- So, the study of economic growth and their determinants is interesting and hot phenomena that is to be addressed to have high level of potential growth that lifts out the society from poverty.

1. Introduction cont'd...

1.2. Statement of the Problem

- **Currently,** the miscellaneous economic growth patterns are quite common in the world. The progression of economic **growth and the source of differences** in economic performance across nations are some of the most interesting, important, and challenging areas in modern social science.
- **So,** the source of economic growth is a question of significant importance concern for many **economists, politicians and policy makers** who are interested to **know and search for factors** enabling some countries to grow and develop **while others are suffering from dismal poverty (Tewodros, 2015).**
- **Ethiopia,** is one of the **poorest countries** in the world with population of more than 88 million (CSA, 2013) with

1. Introduction cont'd…

- The Ethiopian economic growth is characterized by mixed, erratic and averagely inferior performance showing positive and negative real GDP growth rates. For example, it shows a negative growth rates seven times between 1981 and 2010 (WB, 2011).
- There are several studies which have examined the determinants of economic growth in many countries around the world.
- For instance, Barro (2013); Biswas and Saha, (2014) in Asia; Florin (2015) in Central and Eastern Europe; Dewan and Hussein (2001) in 41 middle-income developing country including Africa; Upret (2015) in 76 developing countries ; (NdambiriH.K *et al.,* 2012 and Patrick Enu et al., 2013 in Africa etc. through different methods of analysis at different time by using different determinants of economic grow

- The empirical result of the above studies showed that;
- According to Tadesse (2011) capital labor ratio had positive effect on economic growth in **short run as well as long run** in Ethiopian **during 1981-2009.**
- Another empirical results of Tewodros (2015), showed that physical capital and human capital **had a significant positive** relationship with economic growth **while external debt had a significant negative effect on** it .
- On the other hand, export of goods and service, foreign aid and inflation had insignificant effect on economic growth in the long run in Ethiopia during 1981-2009.
- According to Khalid, Ahmed and Kenji ,(2016) GDP growth has positive and significant long-run

1. Introduction cont'd…

- Yet, there is no comprehensive empirical study which determines factors affecting Ethiopian economic growth.
- Even though the above researchers have tried to identify the major factors affecting economic growth in Ethiopia; However, variables such as, Human capital, inflation, labour force, and financial sector development, Government spending, Population growth and social welfare expenditure were not addressed in their
- Additionally, the Wald test causality findings surprisingly indicate that gross fixed capital formation does not cause GDP growth in short run, which is theoretically unexpected.

1. Introduction cont'd…

Therefore, the thesis tries to fill the above stated researchers gap by including variables such as, Human capital, inflation, labour force, financial sector development, government spending, population growth and social welfare expenditure which were not addressed in their studies and also empirically analyze and identifying the selected determinants of economic growth in Ethiopia both in long run and short run during the specified period of time.

advantage over Engle-Granger and Johansen Co-integration.

1.3. Research Questions

- In order to address the stated problems, this study answers the following research question.
  1. What is the relationship between economic growth and its determinants in Ethiopia?
  2. How economic growth affected by its determinants in Ethiopia?
  2. What factors are more relevant for developing countries particularly to Ethiopia?

1.4.2. Specific objectives

- ☒ To analyze the relationship between economic growth and its determinants in Ethiopia
- ☒ To examine how the selected economic determinant affect economic growth in Ethiopia.
- ☒ To overview the economy in the study period.

1. Introduction cont'd...

1.6.Significance of the Study

- Studying determinants of economic growth in Ethiopia will be provided an insight to;
- policy makers, planners and administrators
- in the formulation of appropriate development strategies

determinants in Ethiopia.

H1: At least some of economic determinant has a relationship with economic growth and

H0: The selected Economic determinants have no significance impact on economic growth

H1: At least some of economic determinant has significance impact on economic growth

1. Introduction cont'd…

- However, Other important determinants of growth which affect economic growth **positively or negatively** such as, unemployment rate, imports, FDI, adopted technological changes, expenditure on research and development, public investment/ domestic private investment, real exchange rate, corruption, weather condition and exploitation of natural resources are not addressed in this study .

including a dummy variable for policy change are namely Gross capital formation, human capital, export, foreign aid, external debt, inflation rate, labor force, financial sector development proxied by domestic credit as % of RGDP, government expenditure as % of RGDP,

1. Introduction cont'd…

herefore, this study is focused on Gross capital formation, human capital, export, foreign aid, external debt, inflation rate, labor force, financial sector development, government spending, population growth, social welfare expenditure and dummy variables for policy changes (M'Amanja D O. (2005).

some change very slowly over time or would thus, be poor at explaining annual growth which can vary significantly and there is simply a limit to the number of variables that can feasibly be included.

1. Introduction cont'd…

1.8. Limitation of the Study

- **It is hoped that** this did not bias the results since the inexistence of the variables will be captured indirectly through the reasonable representation of the variables incorporated in the study.
- To overcome such a problem, the researcher has been restricted to use both domestic and foreign data sources.
- from **inconsistency of data** from different organizations.

1.9. Organization of this paper

The paper is consisted of five chapters.

Chapter one	• is dealing with introduction of the study, statements of problem and Objectives of the study.
Chapter Two	• presents the theoretical and empirical literature reviewed related to economic growth.
Chapter Three	• is having the methodological aspect of the study which includes model speciation, estimation techniques and variable definition.
Chapter Four	• a brief review about Ethiopia economy performance and the regression results as well as its interpretation was presented.
Chapter Five	• The Summary, conclusion and policy recommendation emanating from the study have been provided.

3. Research Methodology

3.1. Research Design

To achieve the objectives of this study, we have been used **quantitative research approach** to investigate the determinant of economic growth in Ethiopia from the period 1974 to 2020 based on the variables of Gross Capital Formation(GCF), Human Capital(HC), Foreign Aid(FAID), External Debt(EXD), Total Export(EXT), Labour Force(LF), Inflation Rate(INF), Financial Sector Development(FD), Government spending(GEXP), Social welfare expenditure(SWEXP), population growth rate(PGR) and a Dummy variable for policy changes (D)

3.3.Data Types and Sources

3. Materials and Methods cont'd…

- In this study, time series secondary data ranging from 1974-2020(46) years were used.
  - secondary data was gathered from various journal, books and annual reports of different organizations.
  - For instance, the data that describe about ;
    - real GDP, gross capital accumulation, total export, Social welfare expenditure and External debt were collected from National Bank of Ethiopia (NBE).
    - financial sector development and government spending as percentage of RGDP were own computation data from National Bank of Ethiopia (NBE)
    - human capital was collected from Ministry of finance and Economic Cooperation (MOFEC).
    - The data for inflation rate and population growth were collecte

3. Materials and Methods cont'd…

3.3. Method of Data Analysis

- in this study, Eview version 10 was employed.
- the results were analyzed through **descriptive statistics summaries** such as;
  - Mean or average values, minimum values, maximum values, and standard deviations were used
  - Used to briefly explain the macroeconomic performances and trends of the variables used in the model.
- **Econometric Analysis** like;
  - Pre estimation t-test and post estimation test were used
  - It includes important tests, the estimation of the model and interpretation of results.
  - and **econometric model** were used

3. Materials and Methods cont'd…

3.3. 1. Theoretical Framework and Model Specification

- The model to investigate the relationship between with economic growth (GDP) and between independent variables in the paper is derived from the approach of extended neo classical growth model.
- Then the **extended model** is given by:
- **Yt = F (GCFt, EHEt, EXTt, AIDt, EXDt, INFt) ..... (13)**

Studies like (Patrick Enu et al., 2013; Biswas and Saha, 2014; Pitie, 2015, and Tewodros, 2015), applied similar econometric

3. Materials and Methods cont'd…

the empirical model of economic growth is expressed as:

$$LY_t = \beta_0 + \beta_1 LGCF_t + \beta_2 LHC_t + \beta_3 LEXT_t + \beta_4 LFAID_t + \beta_5 LEXD_t + \beta_6 INF_t + \beta_7 LLF_t + \beta_8 LFD_t + \beta_9 GEXP + \beta_{10} POPG + \beta_{11} SWEXP + \beta_{12} D + \varepsilon$$

The equation after including new variables is expressed as:

$$Y_t = F(A, GCF_t, EHE_t, EXT_t, FAID_t, EXD_t, INF_t, LF_t, FD_t, D) \quad \ldots\ldots (14)$$

Since, it is a Cobb- Douglass production function it is specified as:

$$Y_t = F(A, GCF_t\beta_1, HC_t\beta_2, EXT_t\beta_3, FAID_t\beta_4, EXD_t\beta_5, INF_t\beta_6, LF_t\beta_7, FD_t\beta_8, D\beta_9) \quad \ldots\ldots (15)$$

3. Materials and Methods cont'd…

Where: -

Yt stands for real GDP at time t, **A** for factor productivity which is constant, **GCFt** for gross fixed capital formation at time t, **HCt** for human capital at time t, **EXTt** for real export at time t, **FAIDt** for foreign aid by using ,**EXDt** for external debt, **INFt** for general inflation rate at time t, **LFt** labour force of the country at time t and FDt financial sector development at time t, **GEXP** for government spending as percentage of **RGDP**, **SWEXP** for Social welfare expenditure, **POPG** for population growth rate **D=** a dummy variables for the policy change, **Et=** error term at time t, **β0=**constant value (an intercept term), **D=** a dummy variables for

3. Materials and Methods cont'd…

- So, ARDL bound testing is specified as:

$$\Delta LRGDP_t = \alpha_{0i} + \sum_{i=1}^{p1} \alpha_{1i} \Delta \mathbf{LRGDP}_{t-i} + \sum_{i=0}^{q1} \alpha_{2i} \Delta \mathbf{LGCF}_{t-i} + \sum_{i=0}^{q2} \alpha_{3i} \Delta \mathbf{LHC}_{t-i} + \sum_{i=0}^{p3} \alpha_{4i} \Delta \mathbf{LFAID}_{t-i} + \sum_{i=0}^{q4} \alpha_{5i} \Delta \mathbf{LEXD}_{t-i} + \sum_{i=0}^{q5} \alpha_{6i} \Delta \mathbf{LEXT}_{t-i} + \sum_{i=1}^{q6} \alpha_{7i} \Delta \mathbf{LINF}_{t-i} + \sum_{i=0}^{q7} \alpha_{8i} \Delta \mathbf{LLF}_{t-i} + \sum_{i=0}^{q8} \alpha_{9i} \Delta \mathbf{LFD}_{t-i} + \sum_{i=1}^{q7} \beta_{8i} \Delta \boldsymbol{GEXPF}_{t-i} + \sum_{i=1}^{q8} \beta_{9i} \Delta POPG_{t-i} + \sum_{i=1}^{q7} \beta_{8i} \Delta \boldsymbol{LSWEXP}_{t-i} \beta_{0i} + \sum_{i=1}^{p1} \beta_{1i} \mathbf{LRGDP}_{t-i} + \sum_{i=0}^{q1} \beta_{2i} \mathbf{GCF}_{t-i} + \sum_{i=01}^{q2} \beta_{3i} \mathbf{LHC}_{t-i} + \sum_{i=1}^{q3} \beta_{4i} \mathbf{LFAID}_{t-i} + \sum_{i=1}^{q4} \beta_{5i} \mathbf{LEXD}_{t-i} + \sum_{i=1}^{q5} \beta_{6i} \mathbf{LEXT}_{t-i} + \sum_{i=1}^{q6} \beta_{7i} \mathbf{LINF}_{t-i} + \sum_{i=1}^{q7} \beta_{8i} \mathbf{LLF}_{t-i} + \sum_{i=1}^{q8} \beta_{9i} \mathbf{LFD}_{t-i} + \sum_{i=1}^{q7} \beta_{8i} \boldsymbol{GEXPF}_{t-i} + \sum_{i=1}^{q8} \beta_{9i} POPG_{t-i} + \beta_{10} D + \sum_{i=1}^{q7} \beta_{8i} \mathbf{LSWEXP}_{t-i} + \varepsilon_t \quad \text{(15.2)}$$

- Where :-Δ is the first difference operator, p and **q** is the optimum lag length for dependent and independent variables respectively.
- α_{1i} --- α_{9i} are short run dynamics of the model and
- β_{1i} --- β_{9i} are long run elasticity,

3. Materials and Methods cont'd…

- bound test will be conducted based on the above equation. As per the result of the bound test;
- if the value of calculate F statistics, is greater than the upper bound I (1), the null hypothesis will be rejected.
- If the calculated value of F statistics is greater than the upper bound, there exists co-integration and the study further will be preceded for error correction version of the above equation.
- If F statistics is less than the lower bound or inconclusive value comes between the lower bound I (0) and upper bound I (1) in this case the researcher will run ARD short run which is based on OLS method.

$$\Delta LRGDP_t=\alpha_{0i}+\sum_{l=1}^{p1}\alpha_{1i}\Delta LRGDP_{t-i}+\sum_{l=0}^{q1}\alpha_{2i}\Delta LGCF_{t-i}+\sum_{l=0}^{q2}\alpha_{3i}\Delta LHC_{t-i}+\sum_{l=0}^{p3}\alpha_{4i}\Delta LFAID_{t-i}+$$

$$\sum_{i=0}^{q4}\alpha_{5i}\Delta LEXD_{t-i}+\sum_{i=0}^{q5}\alpha_{6i}\Delta LEXT_{t-i}+\sum_{i=0}^{q7}\alpha_{7i}\Delta LLF_{t-i}+$$

$$\sum_{l=0}^{q8}\alpha_{8i}\Delta LFD_{t-i}+\beta_{9i}D+\lambda ECT_{t1}+\varepsilon_t \ldots\ldots\ldots (15.3)$$

Where:-

- q_1 --- q_9 are optimal lag length and
  - λ is the speed of adjustment parameter.
  - **ECT** represents the error correction term derived from long run relationship from the above equation.
  - **D** is a variable for the policy change.

3. Materials and Methods cont'd

Seq. No	Variables	Definitions of Variables	Expected Sign
1	Real Gross Domestic Product(RGDP)	is the percentage change in real GDP from one year to another.	
2	Gross Capital Formation(GCF)	➢ refers to the net increase in physical assets (investment minus disposals) within the measurement period. ➢ It is used as an indicator of capital used in the aggregate production function..	+
3	Human Capital(EHE),	➢ It is difficult to measure human capital in economics. As a result researchers use different proxy to human capital . This study will use expenditure to health and education as a proxy of human capital	+
4	Foreign Aid(FAID),	Foreign Aid: is defined as money, food or other resources that one country voluntarily transfers to another, which can take the form of gift, a grant or a loan. Since Ethiopia is one of the poorest	+

3. Materials and Methods cont'd…

3.3.2. Definitions of Variables

Seq .No	Variables	Definitions of Variables	Expected Sign
5	External Debt(EXD),	These loans, including interest, must usually be paid in the currency in which the loan was made	-
6	General Inflation Rate(INF)	inflation is defined as an increase in the overall price level in the country and measured in percent.	
7	Total Export(EXT),	refers to the real monetary values of goods and services produced by one country and purchased by citizens of another country.	+
8	Labour Fource(LF)	In this study the labour force is defined as the employed and unemployed labour force.	
9	Financial Sector Development(FD)	the mostly used parameters used to measure financial sector development are broad money supply to GDP ratio and domestic private credit to GDP.	+

3. Materials and Methods cont'd…

3.3.3. Estimation Techniques

- The study will employ quantitative techniques and econometrics methods to analyze the data.
- The method employed in the study will be based on recent advancements in theoretical and empirical determinants-growth relationships.
- As the data used is time series, both pre-estimation and post-estimation tests will be performed.

3.3.3.1. Pre-Estimation Tests

Regarding post estimation test like;

- Testing for stationary (unit root test)=Using Augmented Ducky-Fuller test.
- Test for normality = using Jarque-Bera test
- Test for co-integration = Using ARDL Bounds test and
- optimal lag length determination=Using either Akaike Information Criterion (AIC), the Schwartz Bayesian Criteria (SBC) or Hannan-Quinn Criterion (HQC) .
- co-integration test will be employed to check the relationship of the variables under study and
- ARDL bound estimation test will be employed as per the result of the co-integration test
- Likewise, post estimation test like:

3. Materials and Methods cont'd…

3.3.3.1. Pre-Estimation Tests

- Likewise, post estimation test like;
- serial correlation test,
- normality test,
- heteroscedasticity test,
- granger causality test and cumulative sum of recursive residuals (CUSUM), cumulative sum of squares of recursive residuals (CUSUMQ) will be employed to test the stability of the model.

3. Materials and Methods cont'd...

- Many economic and financial time series exhibit trending behavior or non-stationery in the mean. Therefore, it is necessary to test the stability of the series before identification of the relationship between variables.
- The regression analysis among the variables would not be consistent and spurious regression problem would occur if unstable data are used.
- So the data must be transformed to stationary form prior to analysis.

3.3.3.1. Pre-Estimation Tests

- Pre-estimation test are parametric test carried out on the time series data to meet the assumptions of the model to be estimated.
- The pre-estimation tests are normality test (Jarque-Bera test), stationarity test (Augmented Dicker Fuller test), co-integration test (ARDL Bounds test) and optimal lag length determination.

3.3.3.1.1. Normality Test (Jarque-Bera Test)

- The basic assumption that sampled data are normally distributed is what many methods of time series analysis depend on (Thode, 2002).
- This assumption is very vital for the reliability of parametric tests results.

3. Materials and Methods cont'd…

3.3.3.1.2. Stationary Test (Augmented Dicker Fuller) (ADF)

- Time series data is said to be stationary when its value tends to revert to its long-run average value and its other properties like the variance and co-variance of the data series are not affected by the change in time (i.e. time invariant) (Shrestha and Bhatta, 2018).
- The most common method for testing unit root for parametric analyses is the Augmented Dickey Fuller (ADF) test.
- Let's assume we have a series for testing unit root. ADF model tests unit root as follows:

$$\Delta y_t = \mu + \delta y_t + \Sigma_{ki=1} \beta_i \Delta y_{t-i} + \varepsilon_t \quad (20)$$

Where: $\delta = \alpha - 1$, α= coefficient of y_{t-1} and Δy_t = First difference of y_t i.e. $y_t - y_{t-1}$

- **The hypothesis of ADF is**
- Ho: $\delta = 0$ (There is unit root, i.e. the series is non-stationary) vs.
- H1: $\delta < 0$ (There is no unit root, i.e. the series is stationary)
- If we do not reject the null hypothesis, the series is non-stationary otherwise the series is stationary.

3. Materials and Methods cont'd…

3.3.3.1.3. Co-integration Test (ARDL Bounds Test)

- There is co-integration between two or more variables if there are forms of equilibrium relationship spanning the long-run (Shrestha and Bhatta, 2018).
- The Bounds test is guided by the assumption of stationary variables at level I(0), at first difference I(1) and never at second difference I(2) (Giles, 2013).
- The bounds test for co-integration, conditional ARDL (p, q1, q2, q3, q4,q5,q6,q7,q8q9,q10,q11,q12) model with 13 variables, will be the hypothesis as:
- H0: bji=0 where ji=1, 2, 3, 4, 5, 6, 7, 8 , 9. 10, 11,12 and 13
- H1:bji≠0 i.e. The null hypothesis is saying that the coefficient of the long-run equations are all equal to zero, which implies there is no co-integration, against the alternative hypothesis which, say the coefficient of the long-run equation are all not equal to zero, which implies there is co- integration.
- If we are unable to reject the null hypothesis then we can only specify the short-run model otherwise we go ahead to specify a standard ARDL model.

3. Materials and Methods cont'd...

- If there is co-integration, the error correction model (ECM) representation will be specified as:

$LRGDP_t = \alpha_{0i} + \beta_{13i}D + \lambda ECT_{ti} + \varepsilon_t$... (17)

Where;

- **λ=**the speed of adjustment parameter with a negative sign which shows convergence in the long-run else the model is explosive.
- **ECT=**the error correction term, the ordinary least squares (OLS) residuals series from the long-run co-integrating regression.
- **α1i, α2i, α3i, α4i, α5i, α6i, α7i, α8i α9i, α10i, α11i and α12i** are the short-run dynamic coefficient of the model's adjustment long-run equilibrium.
- **D=** A dummy variable for policy change
- Where we have the differences **(Δ),** it captures the short-run and where we have the **ECT,** it captures the long-run. The short-run causal effect is represented by the statistical significance of the t-statistic on the explanatory variables (short-run coefficients). If the t-statistic of the coefficients **α1i, α2i, α3i, α4i, α5i, α6i, α7i, α8i α9i, α10i, α11i and α12i** are significant, then we can know the direction of causality from the regressors to the dependent variable (Giles, 2013). The long-run causal effect is captured by the significa

of the λ, which is the parameter for the error correction term (ECT). If λ is ... significant th

3. Materials and Methods cont'd…

- If there is no co-integration the ARDL (q_1, q_2, q_3, q_4, q_5, q_6, q_7, q_8);ARDL bound testing will be specified as:

$$\Delta LRGDP_t=\alpha_{0i}+\sum_{i=1}^{p1}\boldsymbol{\alpha}_{1i}\Delta\mathbf{LRGDP}_{t-i}+\sum_{i=0}^{q1}\boldsymbol{\alpha}_{2i}\Delta\mathbf{LGCF}_{t-i}+\sum_{i=0}^{q2}\boldsymbol{\alpha}_{3i}\Delta\mathbf{LHC}_{t-i}+\sum_{i=0}^{p3}\boldsymbol{\alpha}_{4i}\Delta\mathbf{LFAID}_{t-i}+\sum_{i=0}^{q4}\boldsymbol{\alpha}_{5i}\Delta\mathbf{LEXD}_{t-i}+\sum_{i=0}^{q5}\boldsymbol{\alpha}_{6i}\Delta\mathbf{LEXT}_{t-i}+\sum_{i=1}^{q6}\boldsymbol{\alpha}_{7i}\Delta\mathbf{LINF}_{t-i}+\sum_{i=0}^{q7}\boldsymbol{\alpha}_{8i}\Delta\mathbf{LLF}_{t-i}+\sum_{i=0}^{q8}\boldsymbol{\alpha}_{9i}\Delta\mathbf{LFD}_{t-i}+\boldsymbol{\beta}_{0i}+\sum_{i=1}^{p1}\boldsymbol{\beta}_{1i}\mathbf{LRGDP}_{t-i}+\sum_{i=0}^{q1}\boldsymbol{\beta}_{2i}\mathbf{GCF}_{t-i}+\sum_{i=01}^{q2}\boldsymbol{\beta}_{3i}\mathbf{LHC}_{t-i}+\sum_{i=1}^{p3}\boldsymbol{\beta}_{4i}\mathbf{LFAID}_{t-i}+\sum_{i=1}^{q4}\boldsymbol{\beta}_{5i}\mathbf{LEXD}_{t-i}+\sum_{i=1}^{q5}\boldsymbol{\beta}_{6i}\mathbf{LEXT}_{t-i}+\sum_{i=1}^{q6}\boldsymbol{\beta}_{7i}\mathbf{LINF}_{t-i}+\sum_{i=1}^{q7}\boldsymbol{\beta}_{8i}\mathbf{LLF}_{t-i}+\sum_{i=1}^{q8}\boldsymbol{\beta}_{9i}\mathbf{LFD}_{t-i}+\beta_{10}D+\varepsilon_t \quad \text{(16.)}$$

3. Materials and Methods cont'd...

3.3.3.1.4. Lag Length Selection

- The orders of the lags in the ARDL model will be selected by either Akaike Information Criterion (AIC), the Schwartz Bayesian Criteria (SBC) or Hannan-Quinn Criterion (HQC) .

Then the estimation of the model should be carried out based on the number of lags suggested by the information criteria suggested.

3.3.3.2. Post-Estimation Tests

3.3.3.2.1. Regression Specification Error Test

Ramsey Regression Specification Error Test (RESET) (Ramsey, 1969) for functional form i.e. it tests if non-linear combinations of the fitted values can describe the explanatory variable. If non-linear combinations of the fitted values have power in describing the explanatory variable the model is said to be miss-specified and needs adjustments. Thus, it is used to check whether the specified functional form is correct or not. The non-mathematical null and alternative hypotheses are as follows: H0: No power in non-linear combinations - No misspecification, H1: The non-linear combinations have power–Misspecification.

3. Materials and Methods cont'd...

3.3.3.2.2. Autocorrelation LM Test for Serial Correlation

Breusch-Godfrey test (Godfrey 1978) is applied to test the serial correlation. Mathematically the following should hold true; Covariance ($\varepsilon i, \varepsilon j$) = 0, $\forall$ i, j otherwise the series has a serial correlation. Serial correlation does not affect the unbiasedness of the regression estimators but rather affect the efficiency i.e. the estimators are not BLUE (Brooks 2014). The test has the following general null hypothesis and alternative hypothesis:

H: $p = 0$, No serial correlation in the model,

H: $p \neq 0$, There is serial correlation in the model.

3. Materials and Methods cont'd...

3.3.3.2.4. Test for Heteroscedasticity

Test that all residuals have a constant variance. In the regular OLS estimation as well as for the ARDL model it is assumed that the residuals have a constant variance (homoscedasticity). If the model does not have a constant variance (heteroscedasticity) in the residuals the estimated coefficients will no longer be BLUE and will not have the minimum variance of the unbiased estimators. For the test of heteroscedasticity this study will use the Breusch-Pagan test for heteroscedasticity which has the following very general null and alternative hypothesis:

H0: Constant variance of the residuals – Homoscedasticity,

H0: Non-constant variance of the residuals – Heteroscedasticity.

Decision: If the probability of observed R-square is higher than a probability at five percent level of significance then the null hypothesis is accepted (it means there is homoscedasticity) and if the probability value of observed R-square is lower than a probability at five percent level of significance then the null hypothesis is rejected (it means there is heteroscedasticity).

3. Materials and Methods cont'd…

3.3.3.2.5. Test for Stability

- To assess the stability of the long-run and short-run coefficients CUSUM and CUSUMSQ tests proposed by Brown et al. (1975) can be used.
- If there is instability in the coefficients one may increase the sample size or introduce dummy variables (Naiya & Manap 2013; Juselius 2006; Fuinhas & Marques 2012).

3. Materials and Methods cont'd…

3.3.4. The Autoregressive Distributed Lag Model (ARDL)

- **The ARDL model can be specified** if the variables are integrated of different orders. **That is,** a model having a combination of variables with I (0) i.e. level stationary variables and **I (1)** ,i.e. 1st difference stationary variables order of integration (Nkoro and Uko, 2016).
- **ARDL model** can also be used if all the variables are integrated of order one i.e. stationary after first difference I (1).
- The general model of the ARDL is as follows:

$$y_t = \alpha_0 + \Sigma_{pi=1}\alpha_i y_{t-1} + \Sigma_{qi=0}\beta_i \chi_{t-i} + \beta_{13} D + \varepsilon_t \quad \ldots\ldots\ldots\

3. Materials and Methods cont'd…

Or broken as;

$$y_t = \alpha_0 + \alpha_1 y_{t-1} + \ldots \alpha_p y_{t-p} + \beta_0 \chi_t + \beta_1 \chi_{t-1} + \beta_2 \chi_{t-2} + \beta_0 \chi_{t-} + \ldots \beta_q \chi_{t-q} + \beta_{13} D + \varepsilon_t \quad (17)$$

Where:-

- y_t: Dependent variable (RGDPt)
- Y_{t-1}: Lag of the dependent variable (RGDPt-i)
- χ_t: Independent variable (GCFt, HCt, EXTt, FAIDt, EXDt, INFt, LFt, GEXPt POPGt, SWEXPt)
- χ_{t-i}: Lag of the independent variable (GCFt-i, HCt-i, EXTt-i, FAIDt-i, EXDt-i, INFt-i, LFt-i, LFDt-i GEXPt-i, POPGt-i, LSWEXPt-i)
- p: Optimal lag order associated with the dependent variable in years
- q: Optimal lag order associated with the independent variable in years
- α_0: Constant
- α_i: Coefficient for dependent variable (coefficients for short-run)
- β_i: Coefficient for Independent variable (coefficient for long-run)
- ε_t: Error Term and
- D=A dummy variable for policy changes.

3. Materials and Methods cont'd…

3.3.5. Causality test

- A granger causality test will be made to the selected ARDL model to identify the direction of causality between the dependent variables real GDP and the independent variables.
- That is a pair wise granger causality test will be applied on the selected model to know the direction of the causality of real GDP with independent variables such as Physical capital, human capital, Export, foreign aid, external debt, inflation rate, labor force and financial development .
- In order to estimate the above specified equations (models) and to perform the pre-estimation and post estimation diagnostics tests **Eview10 statistical** packages will be used.

This Table showed that, a unit root test is carried out using the standard Augmented Dickey Fuller (ADF) and Philips-Perron (PP) tests

- However, without Intercept and trend, except RGDP, GCF, Human capital, and labour force all the variables are stationary in first difference. GDP and human capital are stationary in level.

- All explanatory variables are integrated of order One with intercept, intercept and trend and without intercept and trend (I.e. I(1)) while general inflation (INF),Population growth(POPG) and social welfare expenditure(LSWEXP) are integrated of order zero (I(0)) with intercept and trend only.
  - Meaning variables are stationary at level and first difference and level with three specification

F												
LHC	3.21	1	-1.464	0.828	10.879	1.000	-2.823	0.0632*	-3.341	0.0730*	-0.991	0.2835
LEXT	0.60	0.98	-2.295	0.42	2.439	0.996	-6.309	0.0000*	-6.511	0.0000***	-5.724	0.0000***

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- **This Figure showed that**, Akaike information criterion (AIC) is used to determine the optimal lag length of each variable automatically because it is a better choice for small sample size data.

- **Moreover,** according to Pesaran and Shin (1999), for the annual data a maximum of two lag length is recommended to choose the optimal lag for each variable.
- Therefore, in this paper a maximum lag length of 2 was chosen for the conditional ARDL model.

q Finally, in this model, AIC selects the optimal lag length of each variable (LGCF, LHC, LEXT, LFAID, LEXD, INF, LLF, LFD, GEXP, POPG, LSWEXP) respectively and it is ARDL (1, 1, 1, 1, 2, 2, 0, 1, 0, 2, 2, 0)(see figure 4.4).

4.2.2.3. Tests for Long Run Relationship (Bound testing approach to co-integration)

- **After checking** the stationarity of the variables and optimal lag selection criteria, the next step is checking the bound test for co-integration.
- . **To apply** the bound test approach of co-integration, first estimating the ARDL model specified is needed.
- **Then,** the value of **F-statistics** is found through the Wald-test by restricting the long-run equation coefficients to be equal to zero.
- That is, the Wald test(bound test) is conducted by imposing restrictions on the estimated long-run coefficients of variables of interest.
- Then, the computed F-statistic value is compared with the **lower bound and upper bound critical values**

- **This Table showed that**, the calculated F-statistics is **9.132** and this value is higher than the upper bound critical values at 1%, 5% and 10% level of significance F-statistic (see Table 4.4).
- **The results indicate that** there is strong evidence of long-run relationship or co-integration between log of RGDP and the remaining macro variables.
- **Thus**, the **null hypothesis of no co-integration** between RGDP and its fundamentals is **rejected and we should accept the alternative hypothesis.**

10%	1.76	2.77
5%	1.98	3.04
2.5%	2.18	3.28
1%	2.41	3.61

- **This table showed that**, estimated coefficients of GCF, HC, EXD, LF, GEXP and POPG have the expected signs.
- **Again, this Table showed that**, the estimated coefficients of GCF, HC, EXT, FAID, EXD, LF, FD, POPG and GEXP are all statistically significance
- **While** INF and SWEXP are statistically insignificance irrespective of their sign changes

LEXT	-0.18242	0.06099	-2.99094	0.0075***
LFAID	-0.16219	0.04764	-3.40448	0.003***
LEXD	-0.06886	0.02814	-2.44684	0.0243**
INF	0.00084	0.00067	1.255271	0.2246
LLF	0.493181	0.25521	1.932468	0.0683*
LFD	-0.2561	0.04207	-6.08798	0.0000***
GEXP	0.010105	0.00501	2.018128	0.0579*
POPG	0.242597	0.09265	2.618534	0.0169**
LSWEXP	-0.00184	0.00713	-0.25846	0.7988
C	-8.3814	0.6329	-13.24296	0.0000***

- **Finally,the result indicated that, in the long run** as labour force, government speending and population growth increase by one percent, holding other things constant,
  - v leads to approximately 0.4932,0.01010, and 0.2426 percent increase in real GDP respectively during the study period.

4.6: Estimated long run coefficients using ARDL (1, 1, 1, 1, 2, 2, 1, 0, 2, 2, 0)

LGCF	0.206071	0.07296	2.824588	0.0108**
LHC	0.43165	0.06819	6.330014	0.0000***
LEXT	-0.18242	0.06099	-2.99094	0.0075***
LFAID	-0.16219	0.04764	-3.40448	0.003***
LEXD	-0.06886	0.02814	-2.44684	0.0243**
INF	0.00084	0.00067	1.255271	0.2246
LLF	0.493181	0.25521	1.932468	0.0683*
LFD	-0.2561	0.04207	-6.08798	0.0000***
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LSWEXP	-0.00184	0.00713	-0.25846	0.7988
C	8.3814	0.6329	13.24296	0.0000***

This result is consistent with the classical and neo-classical

- A one percent increase in in foreign aid and its one year lagged in

- **The result indicated that, in the short run** as foreign aid, one year

- **Finally, the result indicated that, in the long run** as one year lagged foreign aid and external debt, and population growth increase by one percent, holding other things constant,
  - v leads to approximately 0.798,0.0403, and 0.6818 percent increase in real GDP respectively during the study period.

- **Finally,** in the short run, *the coefficient of equilibrating Error Term (ECM) is -0.9349 suggesting that about 93.49 percent annual adjustments towards long run equilibrium.*
- *That is* since it is *high speed of adjustment (feedback effects towards the long run equilibrium) it takes few years for full adjustment when there is a shock in the system.*

D(GEXP(-1))	-0.022375	0.002094	-10.77833	0.0000***
D(POPG)	0.681756	0.06411	10.6341	0.0000***
D(POPG(-1))	-0.527335	0.051669	-10.20594	0.0000***
POLICYCHANGE DUMMY(D)	-0.012639	0.010157	-1.244402	0.2285
CointEq(-1)*	-0.934861	0.06717	-13.91786	0.0000***

- The results indicate that the F version of the statistics is unable to reject the null hypothesis specified for each test,
  - Because F-test associated were greater than 5% significant level.

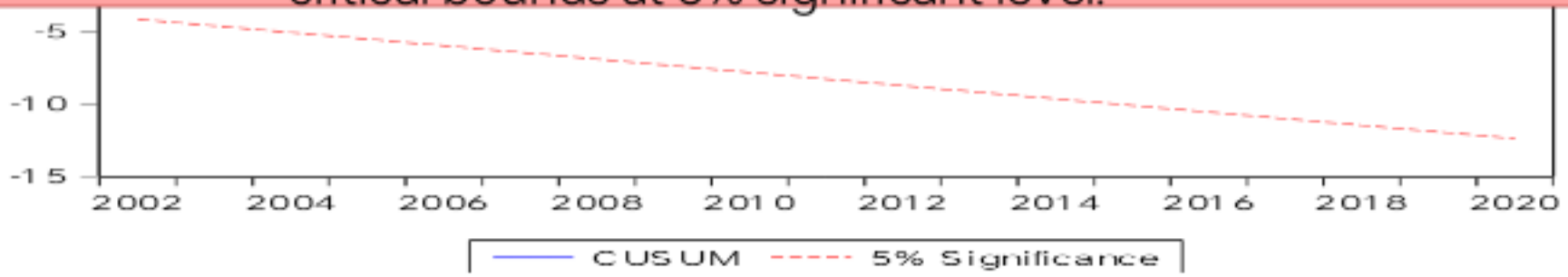
4.2.5.1. Diagnostic testing and model stability

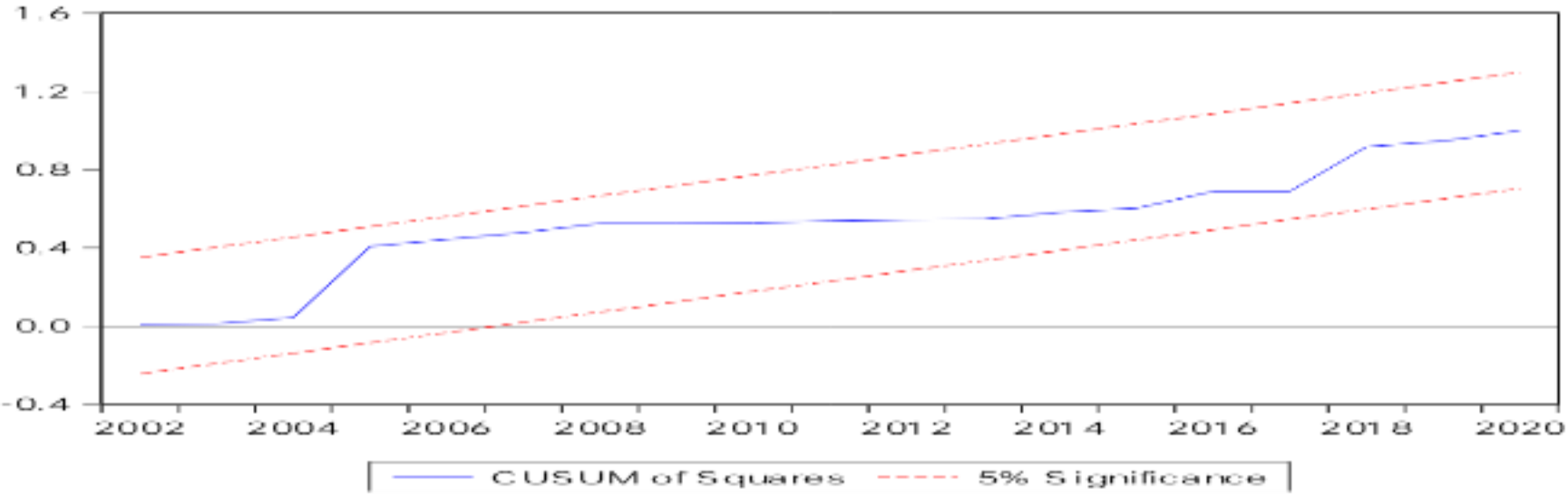
Table 4.8: Diagnostic tests for the ARDL (1, 1, 1, 1, 2, 2, 0, 1, 0, 2, 2, 0)

				(Chi-sq. prob.)	
Serial correlation	No correlation among	**F(2,17)**	**(0.1162)**	(0.0065)	(0.1162)
RESET TEST	No miss specification	**F (1,18)**	**(0.9508)**	Not applicable	Fail to reject
Normality test	Residual are normality Distributed	-	**(0.3787)**	Not applicable	Fail to reject
Hetroscedastici	Residual	Prob. F	**(0.3103)**	(0.3074)	Fail to

- **Therefore**, the plot of CUSUM recursive residual and CUSUMSQ recursive residual shows that there is no structural instability in the model during the period under investigation..

v Because the plot of CUSUM recursive residual and CUSUMSQ recursive residual statistic moves between the critical bounds at 5% significant level.





5.1. Conclusion

- The study was aimed to investigate the determinants of economic growth in Ethiopia.
- The study used, autoregressive distributed lag (ARDL) model under bound test on the annual time series data ranging from 1974-2020.

- In this study, Eview version 10 was employed
- The variables were tested for stationary and co-integration analysis was also carried out via the Augmented Dickey Fuller (ADF) and Philips-Perron (PP) method.
- Also error correction test was performed.

The study found that, among the 12 explanatory variables included in the model to determine economic growth in Ethiopia,

- Five variables namely (Gross capital formation, human capital, export, foreign aid, external debt, labour force, financial development, total government spending and population growth) are the variables that determined Ethiopian economic growth.
- But inflation and social welfare expenditure had an insignificant impact on determined Ethiopian economic growth.
- From these variables that determined Ethiopian economic growth; gross capital formation, Human capital, labor force, government expenditure and population growth had positive impact on the real GDP of Ethiopian in the long run where as External debt has expected negative sign.
- However , export, foreign aid and financial development have unexpected negative significant impacts on the

- **Contrary to our expectation, inflation and social welfare expenditure** have negative impacts on the real GDP of the Ethiopian economy in the long run but insignificant.
  - That means that a change in these variables will does not affect the real GDP of the country.
  - Unfortunately, none of the above (i.e., inflation and social welfare expenditure) impacts are statistically significant at 5% level of significance.

- **Short run error correction model indicated that**, among the 11 explanatory variables hypothesized to impacts economic growth in Ethiopia,
  - Five variables namely (Gross capital formation, human capital, one year lagged of both foreign aid and external debt , and population growth) had significant impact on economic growth in Ethiopia at 1% significance level.

- **Moreover**, this study is found out that economic growth during EPRDF (1992-2020) relatively robust in growth compared to the military regime (1974-1991).

- During the military period, the average growth rate of real GDP was 1.54 percent (real GDP was -0.9%), while the average population growth was 2.61 percent, which indicates the growth rate in real GDP was far away from satisfactory points.

  - However;

✓ during the EPRDF regime, growth is relatively fast and beyond satisfactory.

✓ The average growth rate in real GDP registered 7.74 percent (real GDP per capita was 3.4%) during 1992 to 2020, while the average population growth was 2.73 percent.

✓ Moreover, since 2004, the growth rate in real GDP on average registered 9.74 percent (NBE, 2020/21) and by far more than the average growth rate for Sub-Sahara African Countries.

5.4. Recommendation

- Based on the **findings** and **conclusions** of the study, the following recommendation were forwarded;
- **Gross capital formation has positive** and significance impact on economic growth in Ethiopia both in the short run and long run during the study period,
  - In order to enhance and sustain the economic development develop the contribution of the gross capital formation;
  - the government of Ethiopia has to set policies to increase domestic saving which is believed as a backbone of growth and increase saving mobilization like selling of government Bonds, expanding financial institutions and by strengthening existing saving tools (strengthening both private and government workers social security scheme, strengthening saving for housing program, saving for investment equipment scheme), develop specialized structural bond of the Government for Further Development of Gross Capital formation..
- **Human capital(expenditure of health and education)** impacts economic growth in Ethiopia positively and significantly both in the short run and long run in the study period;
  - In order to enhance the contribution of human capital on economic the concerned bodies should allocate adequate finance in order to increase both the quantity and quality of education and to provide basic and improved health services to the society.
  - This will bring the technological transfer, innovation and efficiency since education and health are the two main complementary pillars for development.

5.4. Recommendation

The result shows that the coefficient of export is negative and significant such that one percent increase in export of the economy will leads to -0.18242 percent decrease in Ethiopian economic growth. This suggests that the country export has negative impact on the nation economic performance. The implication of this result is that the Ethiopian external trade which is dominated by export of primary product is price inelastic and has not increase growth in the country due to its greatly influenced by instability in the world market price.

- Therefore, the Federal Government of Ethiopia should strengthen the existing strategies in export development and promoting investment particularly in the manufacturing sector for export and import substitution.
- Moreover, the researcher recommends that policies that facilitate flexibility in production for exports be formulated.

- **Foreign aid is having negative impact** on Ethiopian economic But for developing countries like Ethiopia, where capital is scarce it is inevitable to depend on alternative sources to finance its mega projects and to fill its resource and budget gaps.
  - So that, the federal government should work to relatively regulate implementation of foreign aid depend on further economic Growth issues;
  - Additionally, the government and other concerning bodies should set a clear cut policy that will lead to the proper management of foreign aid received by allocating them to the intended purpose.

5.4. Recommendation

- External debt has negative and significance impact on economic growth in Ethiopia, during the study period,

  - v So the concerned bodies (Ethiopia government) should have to allocating resources on selected productive investment areas, which used to return back the debt burden and together with basic infrastructure construction that facilities productive of other sector is decisive.

v In addition there should be close monitoring and consistent debt strategies, which is used to avoid misallocation and mismanagement of external debt problem.

- The finding reveals that the positive impact of labor on the Ethiopian economy growth.

  - ➢ Therefore, in order to increase the contribution of labor to growth, the government should upgrade the knowledge and skills of labor force so as to increase their efficiency.
  - ➢ Additionally, since Ethiopia is labor abundant and capital scarce country. So in order to grow faster it should have used the abundant resources properly (uses labor intensive technology).

5.4. Recommendation

- **Population growth has positive** and significance impact on economic growth in Ethiopia both in the short run and long run during the study period,
  - v Therefore, the Federal Government of Ethiopia should have to carefully planned population growth strategy coupled with efficient and effective institutional and economic policy changes could be beneficial.
  - v Additionally, the government should also put measures to sustain the existing economic growth which has been growing at a higher rate than the population growth.
  - v This will ensure that the increasing demand of goods and services arising from the population growth is met. Having a larger, healthier, and better-educated workforce will only bear economic fruit if the extra workers can find jobs.
- **Government spending as percentage of RGDP** impacts economic growth positively and significantly both in the short run and long run in Ethiopia in the study period;
  - ➢ In order to enhance the contribution of Government expenditure on economic the concerned bodies has to make systematical expending of Government finance for adequate social service, economic service and human capital.
  - ➢ Thus educated and healthy societies will bring technology and innovation, which is believed as aspiring board of economic growth.

Galatoomaa! !!!!!

Thank you for Your Attention !!!!!